ILLUMINATED KEYBOARD SYSTEM

The present application is a Continuation-in-Part of U.S. patent application Ser. No. 08/502,913, filed Jul. 17, 1995 now U.S. Pat. No. 5,684,513.

FIELD OF THE INVENTION

The present invention relates to an electrical keyboard, and more particularly to a lighted keyboard utilized in a variety of environments.

BACKGROUND OF THE INVENTION

A wide variety of keyboards are utilized for data entry terminals and remote control terminals. More particularly many laptop computers, personal digital assistants, palmtops, color and black-and-white notebooks, sub-notebooks, remote teleprompter presenter screen-keyboards, pagers, alpha-numeric pager-organizers, desktop computers, audio and/or video devices for recording, editing and/or playback, facsimile machines, TVs, video games, airplane entertainment consoles, avionics systems, automotive systems, navigation systems, musical instruments and the like utilize keyboards of one or more keys for inputting of information. One of the issues with such devices is their use in environments where there is not sufficient light to see the keys. For example, in an airplane or the like, while using a portable computer, the lights may be turned off or lowered due to the viewing of a movie or the like on the airplane. It would be useful to have an illuminated keyboard which will allow one to actually see the keys when inputting information. Similarly, in a situation where there are several people in a particular room looking at a TV program or the like, in the evening, in which it is determined that most of the normal lights should be turned off, it would similarly be useful to provide a keyboard which is lighted. When using a camcorder in low light conditions, it would be useful to have a lighted keyboard for functions such as rewind, fast forward, play, record, exposure control, titling, and others.

There are many lighting arrangements utilized for keyboards. However, these conventional lighting arrangements have the disadvantage of requiring an additional light source which can consume power for illuminating the keypads as well as requiring relatively complex lighting arrangements for providing such illumination.

Accordingly, what is needed is a lighting arrangement for a device that includes a keyboard that is low cost, easy to implement, does not consume additional power and is adaptable to existing devices, including portable devices. The present invention addresses such a need.

SUMMARY OF THE INVENTION

An illuminated keyboard system in a device which includes at least one keypad and an illuminated panel which displays information responsive to the pressing of at least one keypad is disclosed. The improvement comprises a conductor element for conducting a portion of the light from the illuminated panel and illuminator element coupled to the conductor element for illuminating the plurality of keypads with the portion of the light from the illuminated panel.

A portion of the light from the illuminated panel is utilized to illuminate the keyboard thereby allowing for observation of one or more keypads on the keyboard when the surrounding area is dimly lit. The illuminated keyboard system has no effect on the power consumption of the device. This is valuable for all devices, and is especially useful with battery

operated devices. In an embodiment the illuminated keyboard system provides for backlighting the keyboard. In a second embodiment the illuminated keyboard system provides light to a top portion of the keypads. It should be noted that the 'top portion of the keypad(s)' or 'top surface of the keypad(s)' refers to the part of the keypad that is visible or that is touched or depressed to activate the key. Clearly in many types of equipment, for example in camcorders, the top portion or top surface of the keypad may actually be on the top, on the side or on the bottom of the equipment.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of an illuminated keyboard system in accordance with the present invention.

FIG. **2** is a side view of a first embodiment of such a system.

FIG. **3** is a view of one key utilized in such a system.

FIG. **4** is a second embodiment of an illuminated keyboard system in accordance with the present invention.

FIG. **5** is an additional embodiment.

FIG. **6** is an embodiment in a camcorder.

DETAILED DESCRIPTION

The present invention relates to an improvement in the lighting of one or more keypads in a device which includes a keyboard. The following description is presented to enable one of ordinary skill in the art to make and use the invention and is provided in the context of a patent application and its requirements. Various modifications to the preferred embodiment and the generic principles and features described herein will be readily apparent to those skilled in the art. Referring now to FIG. **1**, what is shown is a perspective view of a portable computer **10** including keypads **12** on a keyboard **14**. The portable computer **10** also includes display panel **18** which utilizes the illuminated keyboard **20** system of the present invention. One or more keypads when pressed are utilized to provide images on the display panel. The computer **10** is shown for illustrative purposes only. It is well understood that the illuminated keypad system **20** could be utilized in conjunction with any type of device which includes one or more keypads **12** such as laptop computers, personal digital assistants, palmtops, color and black-and-white notebooks, sub-notebooks, remote teleprompter presenter screen-keyboards, pagers, alpha-numeric pager-organizers, desktop computers, audio and/or video devices for recording, editing and/or playback, facsimile machines, TVs, video games, airplane entertainment consoles, avionics systems, automotive systems, navigation systems, and musical instruments. The critical feature is that the device has some sort of illuminated panel. The illuminated keyboard system **20** utilizes the existing illuminated panel light source as the lighting element for one or more keypads. Through this cooperation of elements, one or more keypads can be illuminated while the device is being utilized in an area where the normal lighting is decreased.

To more specifically describe the present invention, refer now to FIG. **2**, which is a side cutaway view of one embodiment of the present invention. As is seen in this embodiment, in the illuminated keyboard system **20**, a portion of the light is piped via a light pipe coupler **24** from the display panel **18** to the underside of one or more keypads via a light transparent support plane or backlight panel **26**. A portion of the light from the display panel **18** is then utilized to illuminate the back of one or more keypads **12** in the backlight panel **26**.